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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,932	06/26/2003	Aloke Guha	COPA1100-1	8680

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DLA PIPER RUDNICK GRAY CARY US, LLP  
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EXAMINER
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ELMORE, STEPHEN C

ART UNIT	PAPER NUMBER
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2186

DATE MAILED: 08/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/607,932

Applicant(s)

GUHA ET AL.

Examiner

Stephen Elmore

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– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 6-26-2003 through 7-15-2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-13,15,20-24,26,30-32 and 35-39 is/are rejected.
- 7) ☒ Claim(s) 3,14,16-19,25,27-29,33 and 34 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

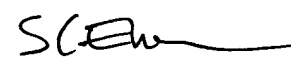
**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

  
**STEPHEN C. ELMORE**  
**PRIMARY EXAMINER**

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/1/03, 4/2/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.



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**DETAILED ACTION**

1. This Office action responds to the application and papers filed June 26, 2003 - July 15, 2005.
2. Claims 1-39 are presented for examination.

***Priority***

3. Applicant's claim for priority based on provisional application 60/409,980 filed September 12, 2003 is not approved -- the provisional application, being directed to different subject matter than is being claimed in the present application, does not provide support for the claims under 35 USC 112, first paragraph.
4. Applicant's claim for priority based on provisional application 60/407,299 filed September 3, 2003 is approved.

***Information Disclosure Statement***

5. The information disclosure statement filed April 2, 2004 contains an entry which has been "lined-through", this is a duplicate of a patent reference already considered.

***Drawings***

6. The drawings are objected to because:
  - a. Figure 1, unlabeled input to element 10;
  - b. Figure 10, contains graphic elements which are unclear because they obscure labels in the figure, all reference characters and descriptive labels must be clearly discernable/readable;
  - c. Figure 12, "stick controler" is misspelled;
  - d. Figure 14, for unlabeled inputs to the figure.

**No new matter should be entered.**

Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of

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the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR § 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Specification*

7. The disclosure is objected to because of the following informalities:

a. The specification's incorporation of a claim for priority to provisional application 60/409,980 filed September 12, 2003 should be removed because the claim for priority is not approved due to lack of enablement under 35 USC 112, first paragraph, from this provisional to this claimed invention, however, it is noted and emphasized that the "incorporation by reference" is not objected-to;

b. paragraphs [0083] and [0088], the equation's use of symbol "\*\*\*" (i.e., a double asterisk) is unclear as to what specific mathematical operation is represented by the symbol because:

first, the disclosure does not explain this usage,

and second, even so, mathematical conventions which may be used in computer programs are inappropriate in this context, using this language in the specification is an ordinary math formula intended to be comprehensible to a human reader, the equation's use of symbol "\*\*\*" makes the disclosure indefinite for a human reader;

c. the use of the potentially trademark products has been noted in this application. If so, the products should be capitalized wherever they appear and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks;

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d. Applicant is reminded of 37 C.F.R. 1.75 (d)(1) which states that the claim or claims must conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description;

1. there is no antecedent basis in the specification for the equation " $f / \{ 1 - (1 - 1/T)^{1/N} \}$ " appearing in claims 22 and 38;

e. in paragraphs [0157] and [0158] it is unclear what is the difference between the activities "refresh" and "restore" -- as far as they are described they appear to be the same activity;

f. references to Figure 2 contradict the presence of Figures 2A and 2B in the actual drawings, there is no Figure 2, only 2A and 2B;

g. paragraph [0079], it is unknown what activity is meant by "contact start-stops (CSSs)";

h. acronym MTTF needs to be explicitly defined.

**Appropriate correction is required.**

#### ***Claim Objections***

8. Claims 16, 18, 33, and 34 are objected to because of the following informalities:

a. ".data" -- typographic error, will be interpreted as if it were "data".

**Appropriate correction is required.**

#### ***Claim Rejections - 35 USC § 112***

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 21 and 37 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the limitation,

*wherein the predetermined fraction has the disclosed mathematical relationship between the elements forming the fraction as has been disclosed in the specification and drawings,*

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does not reasonably provide enablement for the limitations

*wherein a predetermined fraction has all possible variations of mathematical relationships between the elements forming the claimed fraction,*

The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

The scope of coverage for these claims exceeds the scope of enablement as disclosed by the Applicant because the Applicant has enabled only those disclosed mathematical relationships between the elements: failure rate of individual data storage drives, a minimum required service period, and a total number of data storage drives in the system, and Applicant has not disclosed all possible variations of relationships between these elements which could be formed into a predetermined fraction.

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claims 7-10, 22, 35 and 38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims are indefinite because:

a. Claims 7-9 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: related to the use of the terms "shelf" and "shelves" in these claims, first, these are not terms in the art of computer storage, second, there is no structural cooperative relationship in regard to these terms to indicate to an artisan what scope of meaning should be given to the terms, because, for example, from the specification, paragraphs [0065] and [0066], and Figures 2A, 2B and 3, the scope of these terms relate therein to a physical enclosure having pull out shelves in which rows of disk drives are mounted, with many rows of drives in each shelf, however, these claims

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do not mention the structural surroundings which give "shelf" and "shelves" the scope of meaning disclosed in the specification, thus making the scope of meaning of these terms in the claims unclear as to what Applicant intended these terms to mean to an Artisan, especially since it is improper for the Examiner to import limitations from the specification into the claims, therefore, the use of "shelf" and "shelves" in these claims, without additional structural support in the claims to give these terms the scope of meaning as is disclosed in the spec, the structural cooperative relationship of elements is missing, leaving these terms scope unclear in the claims because a shelf -- absent any reference to a physical enclosure where the physical shelf is mounted -- takes away from the meaning of what a "shelf" is in the context of these claims, for purposes of claim interpretation hereafter, a shelf is only a subset of drives, any subset of drives, meaning a shelf can be one drive, two drives taken together, etc.;

b. Claims 22 and 38, the use of the equation containing the symbol "\*\*\*" makes the claim indefinite for the reasons as already given in the objection to the specification, paragraph 7(b) above, which is incorporated by reference;

c. Claim 35, the use of the term "refreshing data" makes the claim indefinite because, first, this is not a regular term in the art of computer storage, having a known and well-defined meaning, second, it does not appear in technical dictionaries, third, it is not defined in the specification nor in the claim, therefore, an Artisan would not know with any degree of certainty what Applicant meant the use of this term to convey as to the scope of meaning of the activity being represented by the term "refreshing", whether this is simply re-copying the data or correcting errors in the data, or some other unstated activity;

d. Claim 10 inherits the deficiency of Claim 7.

***Claim Rejections - 35 USC § 102***

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

***Claim Rejections - 35 USC § 102***

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14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

15. Claims 1, 2, 4-6, 11-13, 15, 20, 23, 24, 26, 30-32, 35, 36 and 39 are rejected under 35

U.S.C. 102(e) as being anticipated by Li et al., US 2002/0144057 ("Li").

Li teaches the claimed invention (Claims 1 and 23) comprising:

**Claims 1 and 23,**

a. A system and method comprising: a plurality of data storage drives [Figure 2, multiple elements 26]; and a controller [Figure 2, element 22] coupled to each of the data storage drives; wherein the controller is configured to power on a first subset (a subset is one or more) of the data storage drives and to power off a second subset (one or more) of the data storage drives [Figure 2, element 28], and wherein each of the first and second subsets contains at least one of the data storage drives [0021, taught by the feature, commands by the control unit 22 instruct an individual storage unit 26 to perform the requested task (power on/off) on an individual basis], and providing a data storage system having a plurality of data storage drives; performing data accesses to the data storage system, wherein the data accesses involve accesses to a first subset of the data storage drives, wherein the first subset of the data storage drives is powered on; and powering down a second subset of the data storage drives, wherein the data accesses do not involve accesses to the second subset of the data storage drives, these data access features are inherent to the performance of individual control of storage units 26 to power on/off [0021] such that, as a consequence of one or more storage units being powered on -- data accesses can be made, and as a consequence of one or more storage units being powered off -- it is self-evident that data accesses cannot be performed to a storage unit having no power applied;



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**Claim 5,**

wherein the data storage drives comprise hard disk drives [0019];

**Claims 2, 6, 24, and 30,**

wherein the plurality of data storage drives comprise a single RAID set of data storage drives [0019]; and wherein the system comprises a RAID system [0019]; and wherein performing data accesses to the data storage system comprises accessing one or more data storage drives and corresponding parity drives, these features are taught [0019] where it is inherent that since RAID configurations are broadly taught then the claimed parity features inherently necessary to RAID configurations are also taught;

**Claims 4 and 26,**

wherein each of the plurality of data storage drives is individually controllable 28 to power the data storage drive on or off 42, 44, independent of the remainder of the plurality of data storage drives [0021];

**Claims 12, 13 and 31,**

further comprising one or more parity drives, each of which is associated with a corresponding RAID set of the plurality of data storage drives and wherein the system is configured to compute parity information for the RAID set by XOR'ing an old parity value with a value currently written to one of the data storage drives in the RAID set to generate a current parity value, and storing the current parity value on the parity drive, these features are taught [0019] where it is inherent that since RAID configurations are broadly taught then the claimed parity features inherently necessary to RAID configurations are also taught;

**Claim 15 and 32,**

further comprising one or more metadata drives, each of which is associated with a corresponding group of the plurality of data storage drives, and wherein performing data accesses to the data storage system comprises accessing one or more data storage drives and corresponding metadata drive, these features are taught [0019] for a RAID configuration for drives 32 where a parity

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drive of the RAID configuration inherently comprises a metadata drive because parity data is data "about" data stored on RAID stripes in the RAID configuration array;

**Claim 35,**

further comprising refreshing data...based on information stored on the metadata drive [0019] taught as performing data integrity checks on the data using the parity drive as a metadata drive;

**Claim 20,**

wherein the first subset comprises no more than a predetermined fraction of the plurality of data storage drives, is taught as noted above [0021], and since individual selected storage units may be powered on/off individually, the scope of predetermined fraction is true for one storage unit equal to the first subset being powered on/off, or is true for the scope of one or more storage units equal to the first subset being powered on/off;

**Claim 26,**

wherein each of the plurality of data storage drives is individually controlled to power the data storage drive on or off, independent of the remainder of the plurality of data storage drives, taught as already noted above [0021];

**Claim 36,**

wherein the first subset comprises no more than a predetermined fraction of the plurality of data storage drives, taught for the same reasons as already noted above.

***Claim Rejections - 35 USC § 103***

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the

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contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

17. Claims 11 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al., US 2002/0144057 ("Li") as applied to claims 1 and 23 above.

Claim 1 is taught by Li, however, Li does not explicitly teach as per dependent claim 11 wherein the data storage drives comprise optical disk drives, however, an Artisan reading that Li teaches [0003] that optical (write-able CDs) drives are historically preferred for archival storage over magnetic drives because they have longer lifetimes and lower power consumption, therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to modify the archival data storage system of Li to incorporate optical drives in lieu of magnetic drives for the benefits of longer lifetime and lower power consumption to the archival data storage system;

Claim 23 is taught by Li, however, Li does not explicitly teach replacing one or more data storage drives that are in the second subset, however, Li acknowledges that storage drives have a lifetime [0003] where it is inherent that a drive at the end of its lifetime is a failed drive, and one of ordinary skill in the art at the time the invention was made would have been motivated in view of Li's suggestion, to replace any drive reaching its end of life for the benefit of continued ability to store data in the archival data storage system.

***Allowable Subject Matter***

18. Claims 3, 14, 16-19, 25, 27-29, 33, 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

19. Claims 7-10 appear allowable over the prior art of record if rewritten to overcome the rejection(s) under 35 U.S.C. § 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

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***Conclusion***


20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Elmore whose telephone number is (571) 272-4436. The examiner can normally be reached on Mon-Fri from 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Kim can be reached on (571) 272-4182. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

August 26, 2005

  
**STEPHEN C. ELMORE**  
**PRIMARY EXAMINER**